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(74) Agent: MARKÓ, József; DANUBIA Patent & Trademark Attorneys, Bajcsy-Zsilinszky 16., H-1051 Budapest (HU).

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(71) Applicant (for all designated States except US): DR-PACK II. [HU/HU]; Budai 10., H-2051 Biatorbágy (HU).

(72) Inventors; and

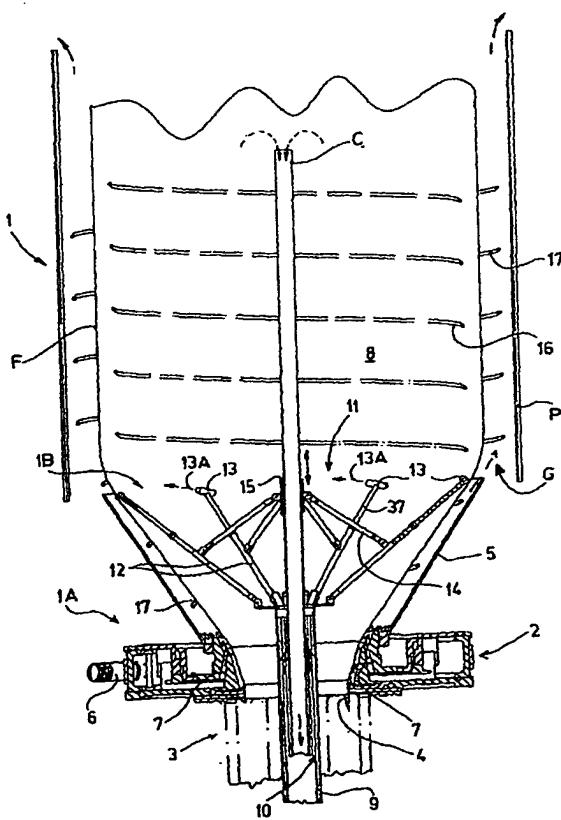
(75) Inventors/Applicants (for US only): PELCZ, Antal [HU/HU]; Seregely 3., H-2040 Budaörs (HU). ILLÉS, Tamás [HU/HU]; Rákóczi 1., H-8913 Lakihegy (HU).

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[Continued on next page]

(54) Title: METHOD AND APPARATUS FOR COOLING EXTRUDED PLASTIC FOIL HOSES



(57) Abstract: This invention relates to a method for cooling extruded plastic foil hose (F), which is cooled down by driving a pressurized coolant along the internal and/or external skirt of the foil hose (F). The coolant is fed in the area of a drawing aperture (4) tangentially to the foil hose (F), and the coolant thus generated is driven as a spiral stream (16, 17) from the tangential inlet (6) to the outlet by a centrifugal force affecting the coolant along the internal and/or external surface of the foil hose (F), and by the density and pressure differences between various parts of the coolant. Said apparatus (1) comprises an internal cooling unit (1B) equipped with a distribution drum (2) provided with nozzles (13) with tangential inlets (13A). Its external cooling unit (1A) has a tangential inlet (6), which is in connection with a ring channel (G) around the foil hose (F), delimited by a tubular element (5, P).

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## AMENDED CLAIMS

[Received by the International Bureau on 17 November 2004 (17.11.2004):  
original claims 1-7 replaced by amended claims 1-7 (2 pages)]

1. In a method for cooling extruded plastic foil hose, which comprises the steps: feeding pressurized coolant, mainly cooling air, to an unstabilized section of the foil hose, and directing the pressurized coolant on the external surface of the unstabilized section of the foil hose; generating at least one external spiral coolant stream from the coolant streams between the coolant inlet and outlet; providing a ring channel for the external spiral coolant stream by using a tubular skirt at a radial distance from the external surface of the foil hose, **characterised in** that the external spiral coolant stream (17) generating tangential coolant streams are directed to a part of the unstabilized section of the foil hose (F) just exiting from a drawing aperture (4) of an apparatus for continuous extrusion of the foil hose (F), mainly extruder nozzle (2); and preferably an internal spiral coolant stream (16), generated by internal tangential coolant streams, is also used and directed on the internal surface of the foil hose (F) for additional cooling and stabilising the unstabilized section the foil hose (F); said cooling and stabilising steps are carried out by using a centrifugal force affecting the spiral coolant streams (17, 16) along the external, and preferably along the internal surface of the foil hose (F), and by using density and pressure differences between various parts of the spiral coolant streams (17, 16).
2. A method as claimed in claim 1, **characterised** by providing with two or more tangential inlet and free outlet for the external spiral coolant stream (17) in the ring channel (G).
3. A method as claimed in claim 1, **characterised** in that both internal and external spiral coolant streams (16, 17) are applied simultaneously, and preferably in counter-current.
4. A method as claimed in any of claims 1 to 3, **characterised** in that during or immediately after the final stage of the cooling and stabilizing steps, the tubular foil hose (F) is cut up longitudinally at least of two places forming flat foil stripes being rolled up separately by roll pairs (H).
5. An apparatus for cooling extruded plastic foil hoses, that is arranged in the area of an extruder nozzle having a drawing aperture, said apparatus comprises an external cooling unit arranged along an external surface of the extruded foil hose, and it is provided with a skirt at a radial distance from the external surface of the foil hose thereby forming a channel, and at least one inlet for a coolant connected to a coolant supply, and an outlet;

said coolant inlet is arranged to the foil hose in such a way to feed the coolant in streams for generating spiral coolant stream in the channel between the coolant inlet and outlet, **characterised in** that said external cooling unit (1A) of the cooling apparatus (1) is arranged direct on the extruder nozzle (3) around the drawing aperture (4); said channel forming skirt of the external cooling unit (1A) is formed by a tubular skirt (P) and/or a conical funnel (5); said inlet of the channel (G) is formed as tangential inlet (6, 7) directed to a part of the unstabilized section of the foil hose (F) just exiting from a drawing aperture (4) for generating the external spiral coolant stream (17) for cooling and stabilising the unstabilized section of the foil hose (F) between the tangential coolant inlet (6, 7) and the outlet of the channel (G); the cooling apparatus (1) is preferably provided with an internal cooling unit (1B) arranged within the extruded foil hose (F); said internal cooling unit (1B) is provided with at least one coolant inlet (13A) arranged tangentially to the unstabilized section of the foil hose (F) to feed the coolant in tangential streams for generating internal spiral coolant stream (16) for cooling and stabilising the unstabilized section of the foil hose (F) between its coolant inlet (13A) and outlet (C).

6. An apparatus as claimed in Claim 5, characterised in that the external cooling unit (1A) has a coolant distribution drum (2) mounted on the extruder nozzle (3) coaxially with the drawing aperture (4), whose tangential inlet (6) communicates with a ring duct (7) coaxially surrounding the foil hose (F), around a part of the unstabilized section of the foil hose (F) just exiting from the drawing aperture (4), and the ring duct (7) joins the ring channel (G).

7. An apparatus as claimed in Claim 5 or 6, characterised in that the internal cooling unit (1B) comprises an air distribution unit (11), which is provided with nozzles (13) arranged to direct tangential coolant streams as coolant inlets (13A) to and along internal perimeter of the unstabilized section of foil hose (F); said nozzles (13) are connected to a pressurized coolant supply and their radial position is adjustable within the internal space of the foil hose (F); the internal cooling unit (1B) is provided with a coolant removal pipe (C) open at its exhaust end, the other end of which is preferably connected to a vacuum unit.